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Improvement of a Multi-Instrument, MultiSatellite Algorithm For High-Resolution Pole-to-Pole Global Precipitation Analyses

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Abstract: Our proposal will aim at the goals of Research Categories 1.4 —Development of multiinstrument and multi-satellite algorithms within the general framework of statistical estimation‖ and 3.1 —Development and implementation of data assimilation precipitation analyses and downscaling of satellite precipitation information for hydrological modeling and prediction. Our proposed project comprises two components: 1. Improving the Kalman Filter – based CMORPH technique We intend to work closely with NASA/GSFC multi-satellite algorithm developers and other PMM scientists to develop the next generation US unified GPM Level 3 merged precipitation algorithm. Specifically, we will Refine our Kalman Filter – based CMORPH to integrate estimates from PMW and IR observations into a high-resolution (8kmx30-min) quasi-global precipitation analysis From 60oS-60oN; ÀModify the Kalman Filter – based algorithm to produce precipitation analysis over a poleto-pole global domain through integrating information from additional sources (e.g. numerical model simulations); Perform bias-correction for the all-satellite merged precipitation analysis through matching PDF of satellite estimates with that of a daily gauge analysis generated at NOAA/CPC; and Reprocess the high-resolution global precipitation analysis using the KF-based CMORPH with bias correction for the entire TRMM/GPM era. 2. Developing a new technique to generate CONUS precipitation analyses of finer resolution for hydrological applications through combining information from the TRMM / GPM L3 global precipitation products and other sources. Specifically, we will Perform bias correction for radar data through PDF matching against a high-resolution (4kmx4km) CONUS hourly gauge analysis being developed at NOAA/CPC; Combine the bias-corrected satellite / radar estimates with the gauge analysis to define regional precipitation analysis at a fine resolution (4kmx4km/hourly); Further correction for orographic effects and wind undercatch may be conducted (through collaborations with other GPM scientists) by including additional information (topography, wind, surface temperature, moisture, ..); and Construct the regional precipitation analysis for the entire TRMM/GPM era.